(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 974 938 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.01.2000 Bulletin 2000/04

(51) Int Cl.[7]: **G07D 5/00**

(21) Application number: **99305848.6**

(22) Date of filing: **23.07.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **23.07.1998 AU PP480498**

(71) Applicant: **Microsystems Controls Pty Limited**
South Melbourne, Victoria 3205 (AU)

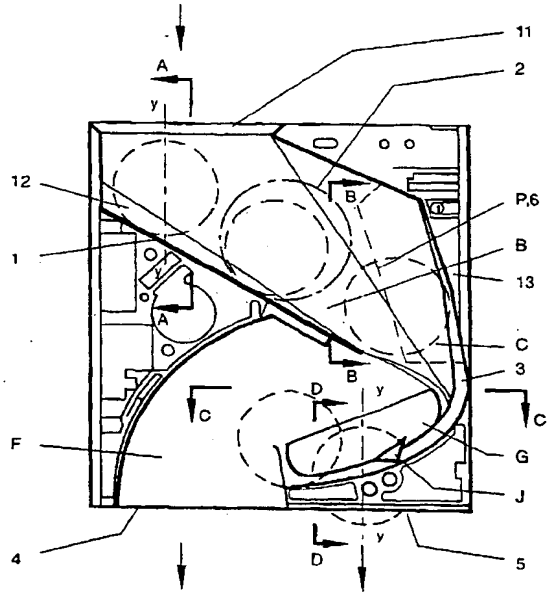
(72) Inventors:
- **Smith, Peter**
  Essendon, Victoria 3040 (AU)
- **Laws, Adam**
  Birchgrove, New South Wales 2041 (AU)

(74) Representative:
Dunlop, Brian Kenneth Charles et al
c/o Wynne-Jones, Lainé & James
22 Rodney Road
Cheltenham Gloucestershire GL50 1JJ (GB)

(54) Improvement in coin validators

(57) A validator for coins including a coin entry (11) though which a coin (12) can pass to enter the validator, coin exit (4, 5) through which the coin can pass as it leaves the validator, and at least one coin rail (1) upon which the coin (12) rolls upon entry into the validator until just prior to exiting the validator, the coin (12) remaining in continuous contact (as defined herein) with the at least one coin rail (1) as it passes through the validator.

Figure 2



EP 0 974 938 A2

Description

Field of the invention

[0001] This invention relates to improvements in coin validators and related coin handling equipment and refers particularly, though not exclusively, to improvements in the coin path within a coin validator. The invention also provides an improved gate at or adjacent the end of the coin path.

Definitions

[0002] Throughout the specification, reference to a coin or coins is to be taken as including reference to a token or slug or other similar device, which is or may be given an actual or nominated value.

[0003] Throughout this specification reference to "continuous contact" of a coin with a rail is not to be limited to absolute terms. Non-continuous but substantially continuous contact including control of the coin as it moves from one control surface to another, is encompassed by the term "continuous contact".

Background to the invention

[0004] In any coin operated apparatus the space envelope for the coin validator, and the relative position of coin entry, coin accept and coin reject slots are all defined by an industry standard.

[0005] Two general layout options are available. The first is an approximately "S" shape where a coin passes through the validator in a path which approximates the letter "S". It is guided through the detect area on a coin rail. This layout allows the validation of any diameter coin (for example, in the range of 16 to 34 millimetres) without changing the validator's physical configuration. That is, any given coin feed stream can consist of a variety of coin diameters such that the validator is a multi-coin validator.

[0006] A typical operation of an S-path validator is described in our Australian Patent Application AU-B81826/91.

[0007] The second option is a "drop through" arrangement where a valid coin drops through a detect field directly to the accept slot. Because detect fields are generally not uniform across the full slot width, it is necessary to place coin guides, slightly wider than the maximum coin diameter, within the slots so that the coin passes through the same part of the field each time. This therefore requires a particular slot width for any given coin. These devices are therefore generally single coin validators.

[0008] Coin feed rates in most applications are only up to a maximum of 2 to 3 coins per second. This means that the validator need only handle one coin at a time.

[0009] However, in the gaming industry, feed rates are controlled by the player and can be up to-15 coins per second, depending on diameter. This means that there can be up to 5 or 6 coins in the validator at any one time. The coin path must be able to serialise these coins so they do not bounce, or overlap each other. This is a difficult problem as fast moving coins striking the various surfaces of an S-path can have random and extreme variations in transitions from one surface to the next.

[0010] Coin bounce is also a problem for accurate discrimination. If a coin is bouncing as it enters the detect field, its relative position in the field with respect to the trigger point will vary and, as the field may not be uniform, so will its signature vary. This may lead to the false rejection of coins which are actually valid. It could also lead to acceptance of coins which are in fact invalid.

[0011] Random coin bounce can also cause speed variations which in turn can cause coins to often catch up to one another. If two coins have a combined thickness less than the width of the coin path, they can overlap each other. Valid coins overlapping at the detect field will cause those overlapping, valid coins to be rejected.

[0012] Coins overlapping after validation as they pass towards the coin accept slot will only be registered as a single coin by the credit recordal mechanism within the validator thus causing a loss of credit, otherwise known as coin steal.

[0013] Furthermore, coins overlapping anywhere within the coin path have the potential to cause a coin jam with resultant machine down time, and labour costs to come and clear the machine.

[0014] With present validators a coin contacting a reject gate may impart relatively high forces to the gate. Such forces are applied to the solenoid in full or in part such that relatively strong return springs and relatively strong solenoids are required.

[0015] It is therefore an object of the present invention to provide a multi-coin validator.

[0016] It is a further object of the present invention to provide a validator for coins which addresses the problem of coin bounce and, in consequence, coin overlaps and coin jams for coins of varying size and feed rates.

[0017] A further object is to provide a gate for a coin validator where the force of a coin contacting the gate is at an angle of approximately 90° or more to the plane of the longitudinal axis of the solenoid and/or return spring.

Brief summary of invention

[0018] With the above and other objects in mind, the present invention provides a validator for coins (as defined herein) including a coin entry though which a coin can pass to enter the validator, at least one coin exit through which the coin can pass as it leaves the validator, and at least one coin rail upon which the coin rolls upon entry into the validator until just prior to exiting the validator, the coin remaining in continuous contact (as defined herein) with the at least one coin rail as it passes through the validator.

[0019] The coin rail may be a continuous rail or may have a number of portions. Preferably, if a number of portions, there may be a first portion, a transfer portion, and an exit portion.

[0020] The present invention also provides a validator for coins (as defined herein) including a coin entry through which a coin can pass to enter the validator, at least one coin exit through which the coin can pass as it leaves the validator, and at least one coin rail upon which the coin rolls upon entry into the validator until just prior to exiting the validator, the coin rail having two adjacent surfaces at an included angle of less than 180º to define therebetween a surface intersection line. The surface intersection line causes the coin to rotate thereabout to control the movement of the coin through the validator.

[0021] Preferably, the coin rail includes a first side wall extending generally upwardly from a base, the first side wall having an upper portion extending upwardly from a lower portion at the included angle relative thereto.

[0022] Advantageously, the base has a first portion extending outwardly from and generally perpendicular to the lower portion of the first side wall. The base may also have a second portion extending outwardly and upwardly from the first portion; and a third portion extending further outwardly and further upwardly from the second portion.

[0023] There may be provided a second side wall spaced from and generally parallel to the upper portion of the first side wall, and which may be opposite and aligned with the upper portion of the first side wall. The second side wall may extend downwardly below the surface intersection line.

[0024] Preferably, the lower portion of the first side wall is of a lesser height than the diameter of a coin to pass therealong.

[0025] The coin rail has a second portion which may have a second base and a further side wall generally spaced from but adjacent to the second base and an outlet end of an intermediate wall respectively.

[0026] Advantageously, there is provided a release plate having an inner surface contactable by a coin; the release plate preferably being aligned with the first portion of the coin rail. The release plate may extend downwardly beyond the surface intersection line.

[0027] The present invention also provides a gate for a coin validator, including a solenoid, a mechanism operated by the solenoid to move the gate between a first position to allow a coin to pass, and a second position to deflect the coin, the mechanism being locked when in the second position.

[0028] The mechanism may include a yoke fitted to the outer end of a plunger of the solenoid. The plunger may be biased to an outer position. Preferably, the yoke has at least one pin extending outwardly therefrom, the pin being located in a somewhat "S" shaped slot in a side of the gate. The gate may have a first end with a projection which, when in the second position, extends into a coin path to act upon the coin, and a second end about which the gate can pivot such that, upon the solenoid being operated, the yoke can move to enable the pins to move along the path prescribed by the slot in the side of the gate. The movement of the pins forces the gate to pivot about the second end to remove the first end from the coin path, thus placing the gate in the first position.

Brief description of drawings

[0029] In order that the invention may be fully understood, there shall now be described preferred constructions of varying embodiments of the present invention, the description being with reference to the accompanying illustrated drawings in which:

Figure 1 is in an illustration of a typical S-path system operating prior to the creation of the present invention;

Figure 2 is a view corresponding to Figure 1 of a validator incorporating the principle features of the present invention;

Figure 3 is a vertical cross section along the lines and in the direction of arrows A-A of Figure 2;

Figure 4 is a cross sectional view along the lines of and in the direction of arrows B-B of Figure 2;

Figure 5 is a schematic view corresponding to Figure 2, showing the movement of coins through the validator;

Figure 6 is a cross sectional view along the lines and in the direction of arrows DD of Figure 2 when in the first position;

Figure 6a is cross sectional view along the lines and in the direction of arrows C-C of Figure 2 when in the first position;

Figure 6b is a view corresponding to Figure 6a but in the second position; and

Figure 7 is a perspective view of the gate of Figures 6a and 6b.

Description of preferred embodiment

[0030] To refer firstly to Figure 1, which shows the device described ih our Australian Patent Application AU-B81826/91, a coin enters the coin accept slot under gravity where it strikes the coin rail 32. The coin rolls down the coin rail 32. and into the detect field 40. The detect field 40 is triggered when the leading edge of the coin interrupts an optical beam 46 which is arranged to

cross the coin part 26. Coin validation takes place at this instance.

[0031] In the case of an invalid coin, the reject gate 44 remains closed and the coin is directed towards the coin reject slot 24. No credit is given. In the case of a valid coin, the reject gate 44 opens allowing the coin to pass towards the coin accept slot 22. Another optical beam 94 across the coin accept slot 24 indicates when the coin leaves the validator and initiates the appropriate credit output.

[0032] To now refer to Figure 2, which shows the principle features of the present invention, and where a coin enters at entry 11. The coin, at this time designated 12 and shown in relief throughout the figure, lands on a rail generally designated as 1 and rolls smoothly down rail 1 to the detect field 2. It remains in continuous contact with the rail 1 until it enters the coin transfer mechanism generally designated as 13. Here, the coin 12 transfers from rail 1 to the exit rail 3 and out the appropriate exit. This can be the accept path 4, or the reject path 5.

[0033] In this way the coin 12 is in continuous contact with the coin rail from the time of entry and contact with the first coin rail 1, through the transfer mechanism 13 and onto rail 3. It is only when it reaches either the reject path 5 or the accept path 4 at the very end of the validator that the coin ceases to contact a rail or be controlled by the various surfaces.

[0034] To refer now to Figure 3, where the coin rail 1 is shown in detail, the rail mechanism consists of a number of static surfaces arranged in such a way to convert some of the kinetic energy of the falling coin 12 impacting upon the rail 1 to rotary motion in two planes thereby eliminating rebound or bounce from the rail.

[0035] The leading edge of an incoming coin strikes surface generally designated as R of the rail 1. The rail 1 also has three portions - a first portion 15 extending perpendicular to and outwardly from a lower portion 16 of a first side wall generally designated as 17; a second portion 18 extending outwardly and upwardly from first portion 15; and a third portion 19 extending further outwardly and further upwardly from the second portion 18. The bottom left-hand edge 34 of the coin 12 therefore slides down the rail surface R, along the third portion 19 and, if of appropriate size, into contact with the second portion 18. The lower portion 16 of side wall 17 has a surface A and the lower edge of coin 12 locates between surface A and the upper surface of second portion 18, or third portion 19. The motion of the coin 12 sliding down the rail surface R causes the coin to pivot about the line 36 of intersection of surfaces A and B and to rotate about its axis XX until the upper edge of the coin 12 contacts the outer surface D of second side wall 20. The included angle between surfaces A and B is less than 180º to cause the line 36. It is preferred that side wall 20 is formed by the access door of the validator.

[0036] The side wall 17 has an upper portion 21 which has a surface B. Upper portion 21 and second side wall 20 are generally parallel and spaced apart. It is also preferred that the second side wall 20 be aligned with the upper portion 21. The coin 12 therefore has, in general, three points of contact - where it contacts the surface D of second side wall 20, the surface R of second portion 18 or third portion 19 of rail 1, and the intersection line 36 of the surfaces A, B of lower portion 16 and upper portion 21 of side wall 17.

[0037] As shown in Figure 2, as the rail 1 is on an angle, the impact point of the coin on the rail 1 is to the left of the coin axis YY, causing it to rotate about this axis. The combined rotation of the coin 12 about the axes XX (Figure 3) and YY (Figure 2) absorbs some of the kinetic energy created during the fall of the coin leaving the coin to roll down the rail.

[0038] Due to the nature of the construction of the rail 1, there is always provided a clearance 14 between the lower right edge of the coin, and surface A. This will tend to prevent the coin 12 bouncing as the edge at each side of the coin 12 cannot contact the two surfaces at the same time. Furthermore, the angled nature of rail 1 makes it difficult for coins to overlap as the angles are such that the leading edge of a trailing coin would contact the trailing edge of a leading coin, and remain in that relative position.

[0039] In Figures 2 and 4, there is shown the transfer mechanism generally designated as 13. The mechanism consists of a number of static surfaces arranged in such a way to transfer the coin control from the entry rail 1 to the exit rail 3 and cause the coin to change direction by approximately 90° without bounce, loss of speed, or loss of control.

[0040] The control surfaces are provided on the chassis of the validator, and release plate 6 the edge of which is defined by the broken lines. The operatibn of the control surfaces is the same as those at the entry of the coin into the validator.

[0041] As the coin 12 rolls down the entry rail 1, the leading edge leaves the detect area 2 and passes under the release plate 6 contacting the inner surface P of release plate 6. The release plate surface P is arranged to form a converging wedge 38 with surface F of side wall 22, the surface F being on a lower portion 23 of side wall 22. Side wall 22 has an upper portion 56 which has a surface C. Surface C is inclined to surface F so as to provide a turning clearance for the coin with the included angle between surfaces C and F being less than 180º. Release plate 6 is generally aligned with rail 3.

[0042] As the leading edge of coin 12 slides under plate 6 into the wedge formed by surfaces P and F, it is rotated about line 58 being the intersection of surfaces C and F, and thus about its axis XX, into a plane roughly parallel with a surface (not shown) but generally designated by E. This action releases the coin 12 from being in contact with the surface S of the rail 31 which is the rail 1, but of a different profile. In this region the rail 31 tapers in its width to a reduced width to assist the transfer function. This then transfers the lower edge 25 of coin 12 to surface E, which at this time is the exit rail 3.

[0043] Naturally, the height of upper portion 24 and release plate 6 is intended to allow for coins 12 of varying diameter. It is preferred that the release plate 6 extends downwardly beyond the region where lower portion 23 joins with upper portion 24. It is further to be noted that a clearance 60 is provided between upper edge 27 of coin 12 and surface C.

[0044] The action of the coin 12 driving into the wedge 38 and the resultant rotation prevents bounce in a similar manner to the way in which bounce is prevented upon the coin entering the validator. The relative position of the surfaces ensures that the coin does not release from the rail 31 until the exit rail 3 assumes control over the coin. There is therefore continuous contact of the coin with a rail, and therefore control over the coin is maintained. At the entry into the validator, the coin 12 is controlled by surfaces A and B and restrained by surface D. At the transfer mechanism 13, the operation of surfaces F, C is the same as A, B, except that there is no surface D to restrain the coin.

[0045] In Figures 6, 6a, 6b and Figure 7 there is shown in some detail the mechanism generally shown by the letter G of Figure 2.

[0046] The mechanism G includes a solenoid activated gate to which is attached a cam 52 having a profile surface J which protrudes across rail 3 in a position above the reject opening 5.

[0047] The leading edge of an invalid coin 12 rolling along the exit rail 3 strikes the reject cam surface J (Figure 5b). This action rotates the coin about axis YY of the coin 12, off the exit rail 3, and directs its leading edge into the exit opening 5 between surfaces F and H, where it is transferred laterally to be clear of the exit rail 3 and can fall under its own weight. In this way there are no surfaces on which the coin can jam, and thus the coin rail 3 is clear for a following coin.

[0048] This action has two definite advantages. Firstly, it transfers the coin 12 clear of a valid, following coin travelling along the exit rail 3 thereby rejecting the invalid coin without having to delay the valid coin until the rejected coin is clear of the exit rail 3. A valid coin 55 can pass along exit rail 3 and to the accept passage way 64, which is an opening between surfaces F and H. Coin rail 3 terminates above accept passageway 64.

[0049] The second advantage is because the surface 12 simply "kicks" the valid coin off the rail 3 into the void 5 between surfaces F and H (which forms the reject coin exit pathway 5), there is no possibility of coin jams if there is a sequence error between the gate timing and the coin.

[0050] To refer to Figures 6, 6a, 6b and 7, a yoke 41 with two opposed pins 42 at each side is fitted to the end of a plunger 30 in an open frame solenoid 66, and is arranged to slide between two parallel surfaces 50. The yoke pins 42 run in somewhat S-shaped slots 45 formed in each side 54 of the reject gate 68, which is pivoted at one end at 51, with the other end 47 having a cam 52 with surface J.

[0051] In the reject position, whereby surface J of cam 52 protrudes over coin rail 3, via an opening 62 in surface F of exit rail 3, a return spring 48 extends the plunger 30 from the solenoid 66 such that the yoke pins 42 rest in flats 49 at the end of the slots 45 in the side walls 54 of the gate 68. These flats 49 are at right angles to the force applied on the reject gate 68 by a coin. As the yoke 41 is only able to slide in a plane parallel to the axis of the solenoid 66, any force applied to the reject gate 68 is at right angles to, and is therefore resisted by, the yoke pins 42 without any load being placed on the return spring 48 or solenoid 66. Therefore, the gate G is locked in position. To unlock the gate G to accept a valid coin 55, the solenoid 66 is activated. As the plunger 30 and yoke 41 retract, the yoke pins 42 leave the flat 49 and move into the inclined slots 45 in the sides 54 of reject gate 68. Because the yoke 41 can only move parallel to the axis of solenoid 66, the pins 42 lift the reject gate 68 to pivot about its end 51 which therefore rotates the gate 68 to clear surface J from the exit rail 3.

[0052] The power to release the lock and accept a valid coin 55 is very small and need only overcome the light return spring 48 and the internal friction of the mechanism. This means that a small, low-powered solenoid 66 can be used. Furthermore, as the impact of a coin on the surface J is resisted by the locking mechanism, and not the return spring 48 on the solenoid 66, a weak return spring 48 can be used. If this were not the case, a much stronger return spring would be required to resist the coin load and therefore a much more powerful solenoid would be required to overcome that spring. As the force applied to the cam 52 is in a plane perpendicular to the slots 45 it cannot effect the location of the pins 42 in those slots 45, particularly when they are in the flats 49. If the force applied to the cam 52 is more than 90° to surface J, the force will assist the locating of the pins 42 in the flats 49 and thereby assist gate G remaining in the reject position. This provides a safety measure in that if there is a difficulty with a coin, it will be rejected, rather than be incorrectly accepted. Furthermore, in the event of a power failure, a coin will be rejected rather than accepted.

[0053] Whilst there has been described in the foregoing description preferred constructions of various embodiments incorporated in the principal features of the present invention, it will be understood by those skilled in the technology concern that many variations and modifications in details of design or construction may made without departing from the essential features of the presenting invention.

[0054] It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

[0055] It will also be understood that the term "comprises" (or its grammatical variants) as used in this spec-

ification is equivalent to the term "includes" and should not be taken as excluding the presence of other elements or features.

Claims

1. A validator for coins (as defined herein) including a coin entry though which a coin can pass to enter the validator, at least one coin exit through which the coin can pass as it leaves the validator, and at least one coin rail upon which the coin rolls upon entry into the validator until just prior to exiting the validator, the coin remaining in continuous contact (as defined herein) with the at least one coin rail as it passes through the validator.

2. A validator for coins as claimed in claim 1, wherein the coin rail is a continuous rail.

3. A validator for coins as claimed in claim 1, wherein the rail has a number of portions.

4. A validator for coins as claimed in claim 3, wherein the number of portions include a first portion, a transfer portion, and an exit portion.

5. A validator for coins (as defined herein) including a coin entry through which a coin can pass to enter the validator, at least one coin exit through which the coin can pass as it leaves the validator, and at least one coin rail upon which the coin rolls upon entry into the validator until just prior to exiting the validator, the coin rail having two adjacent surfaces at an included angle of less than 180º to define therebetween a surface intersection line, the surface intersection line causing the coin to rotate thereabout to control the movement of the coin through the validator.

6. A validator for coins as claimed in claim 5, wherein the control of movement is to reduce the bounce of the coin.

7. A validator as claimed in claim 5, wherein the control of movement is to transfer the coin from a first portion of the coin rail to a second portion of the coin rail.

8. A validator for coins as claimed in any one of claims 5 to 7, wherein the coin rail includes a first side wall extending generally upwardly from a base, the first side wall having an upper portion extending upwardly from a lower portion at the included angle relative thereto.

9. A validator for coins as claimed in anyone of claims 5 to 8, wherein the base has a first portion extending outwardly from and generally perpendicular to the lower portion of the first side wall.

10. A validator for coins as claimed in claim 9, wherein the base has a second portion extending outwardly and upwardly from the first portion.

11. A validator for coins as claimed in claim 10, wherein the base has a third portion extending further outwardly and further upwardly from the second portion.

12. A validator for coins as claimed in any one of claims 8 to 11, wherein there is provided a second side wall spaced from and generally parallel to the upper portion of the first side wall.

13. A validator for coins as claimed in claim 11, wherein the second side wall is opposite and aligned with the upper portion of the first side wall.

14. A validator for coins as claimed in any of claims 9 to 13, wherein the first portion of the base is of the same or lesser width than the width of a coin to pass therealong.

15. A validator for coins as claimed in any one of claims 8 to 14, wherein the lower portion of the first side wall is of a lesser height than the diameter of a coin to pass therealong.

16. A validator for coins as claimed in any one of claims 8 to 14, wherein the second side wall extends downwardly below the surface intersection line.

17. A validator for coins as claimed in anyone of claims 7 to 10, wherein the second portion of the coin rail has a second base and a further side wall spaced from but adjacent to the second base and an outlet end of an intermediate wall respectively.

18. A validator for coins as claimed in claim 17, wherein there is provided a release plate having an inner surface contactable by a coin.

19. A coin validator for coins as claimed in claim 18, wherein the release plate and the lower portion of the side wall form a converging wedge.

20. A validator for coins as claimed in claim 18, or claim 19, wherein the release plate is aligned with the first portion of the coin rail.

21. A validator for coins as claimed in any one claims 18 to 20, wherein the release plate extends downwardly beyond the surface intersection line.

22. A gate for a coin validator, including a solenoid, a

mechanism operated by the solenoid to move the gate between a first position to allow a coin to pass, and a second position to deflect the coin, the mechanism being locked when in the second position.

23. A gate for a coin validator, as claimed in claim 22, wherein the mechanism includes a yoke fitted to the outer end of a plunger of the solenoid.

24. A gate for a coin validator as claimed in claim 23, wherein the plunger is biased to an outer position.

25. A gate for a coin validator as claimed in claim 23 or claim 24, wherein the yoke has at least one pin extending outwardly therefrom, the pin being located in a somewhat "S" shaped slot in a side of the gate.

26. A gate for a coin validator as claimed in any one of claims 23 to 25, wherein the gate has a first end with a projection which, when in the second position, extends into a coin path to act upon the coin, and a second end about which the gate can pivot such that, upon the solenoid being operated, the yoke can move to enable the pins to move along the path prescribed by the slot in the side of the gate.

27. A gate for a coin validator as claimed in claim 25, wherein the movement of the pins forces the gate to pivot about the second end to remove the first end from the coin path, thus placing the gate in the first position.

28. A validator for coins as claimed in any one of claims 1 to 4, or any one of claims 5 to 21, when fitted with the gate of any one of claims 22 to 27.

Figure 1

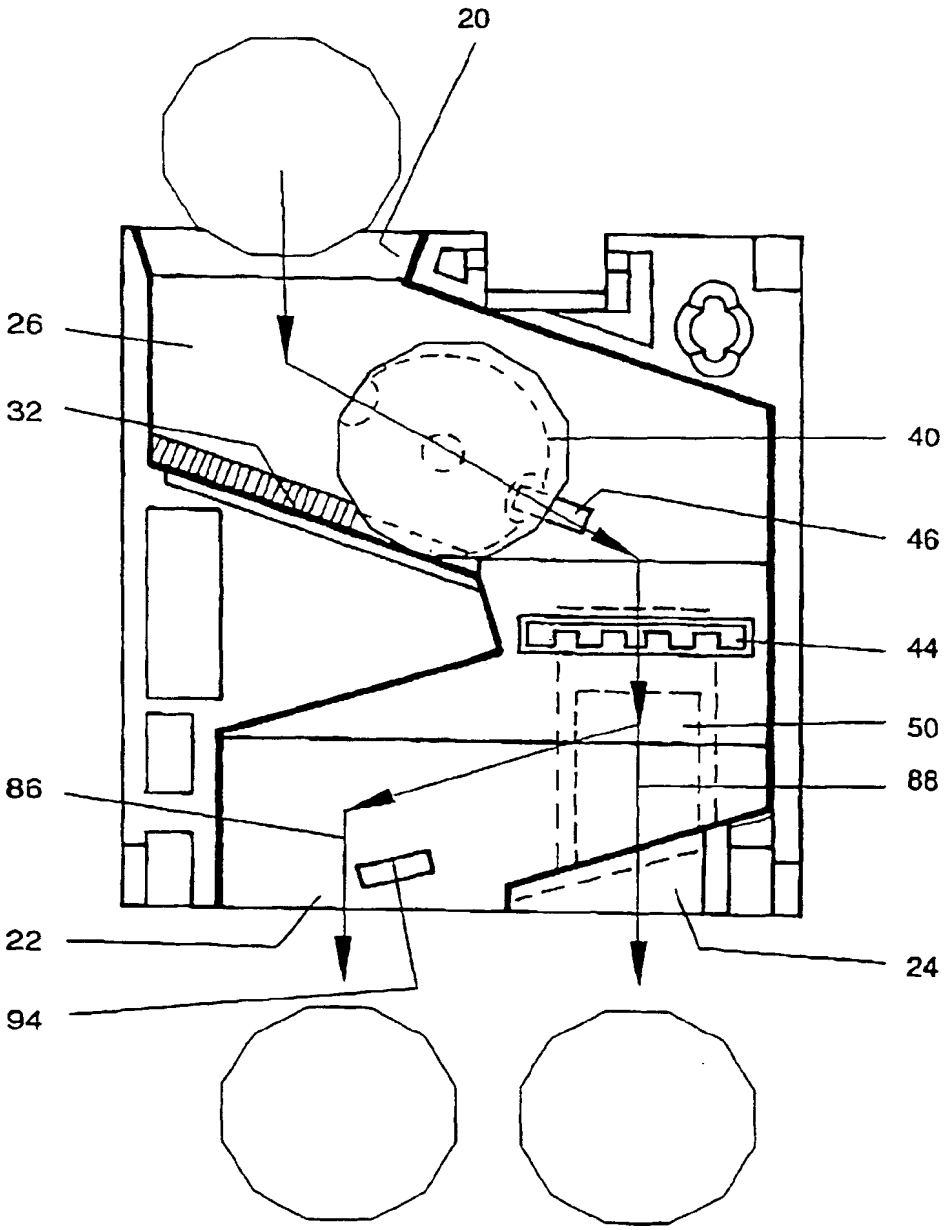


Figure 2

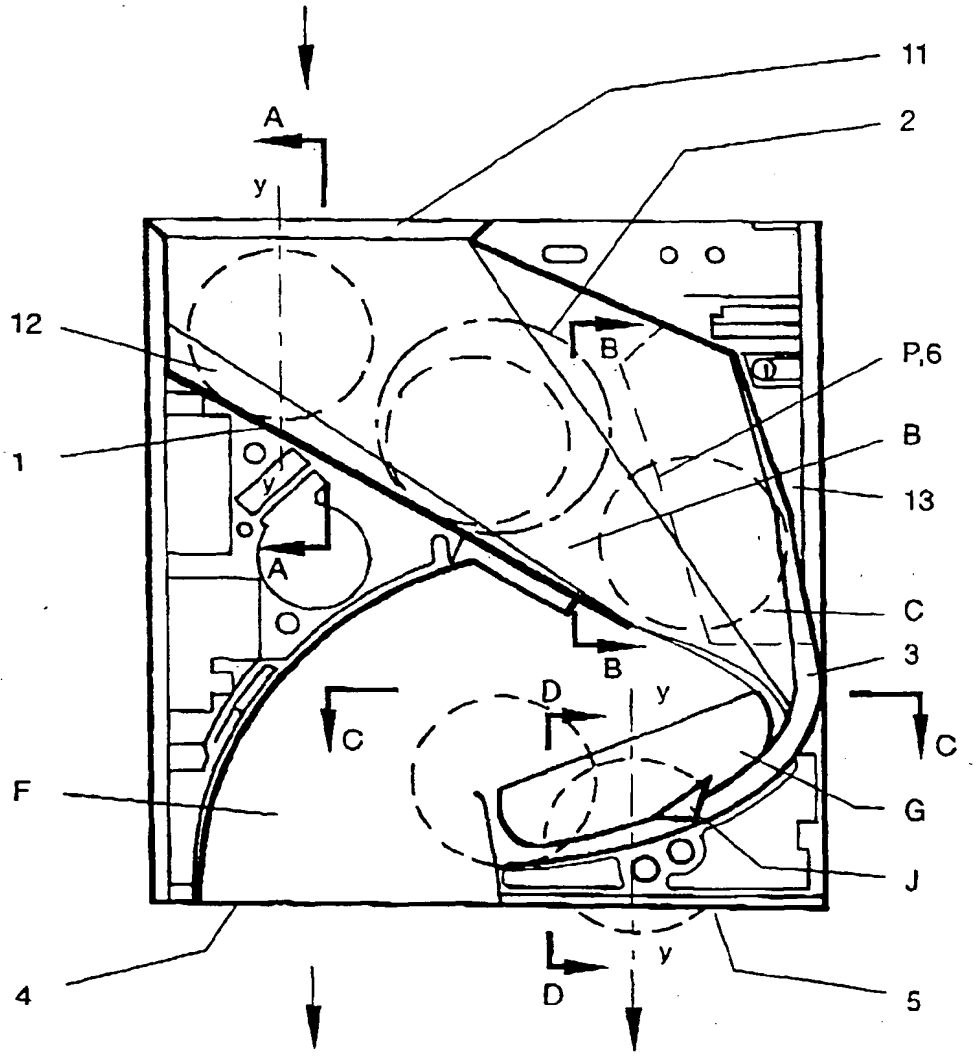


Figure 3

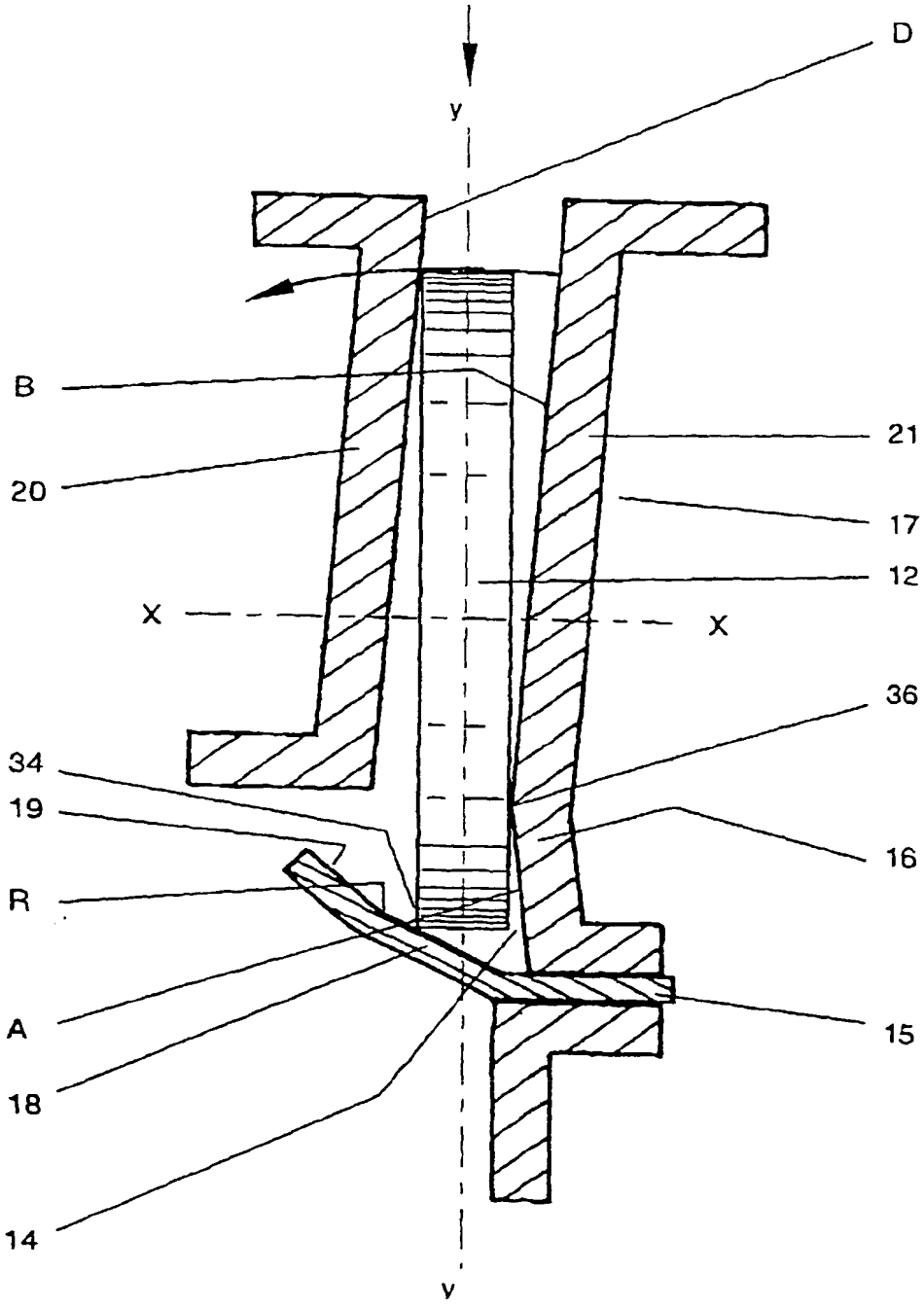


Figure 4

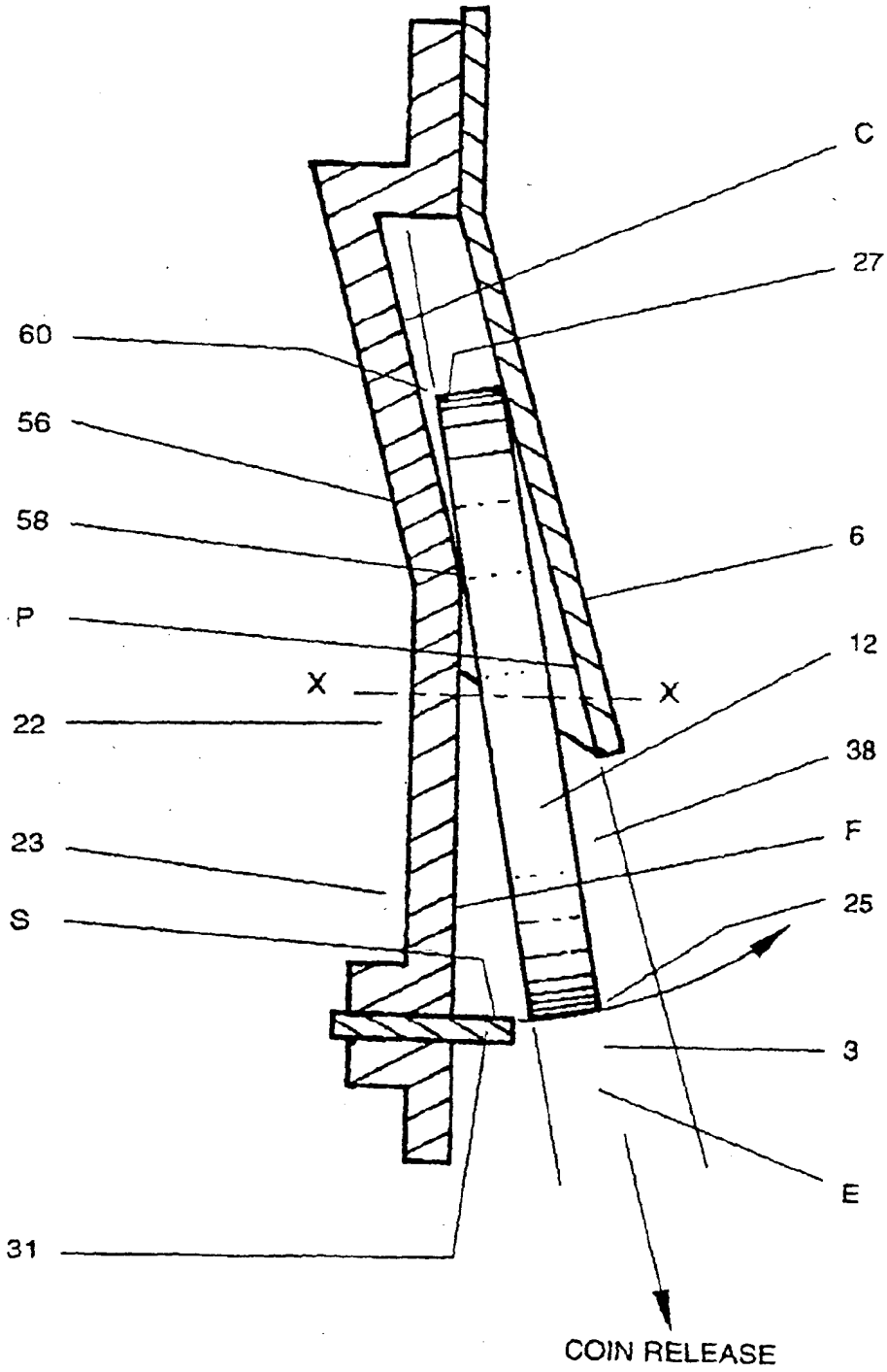


Figure 5

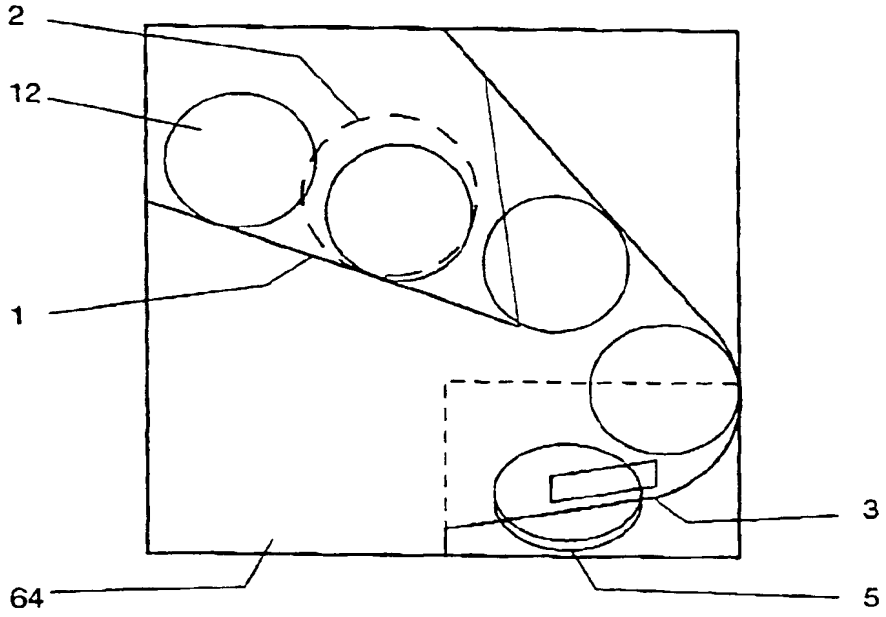


Figure 6

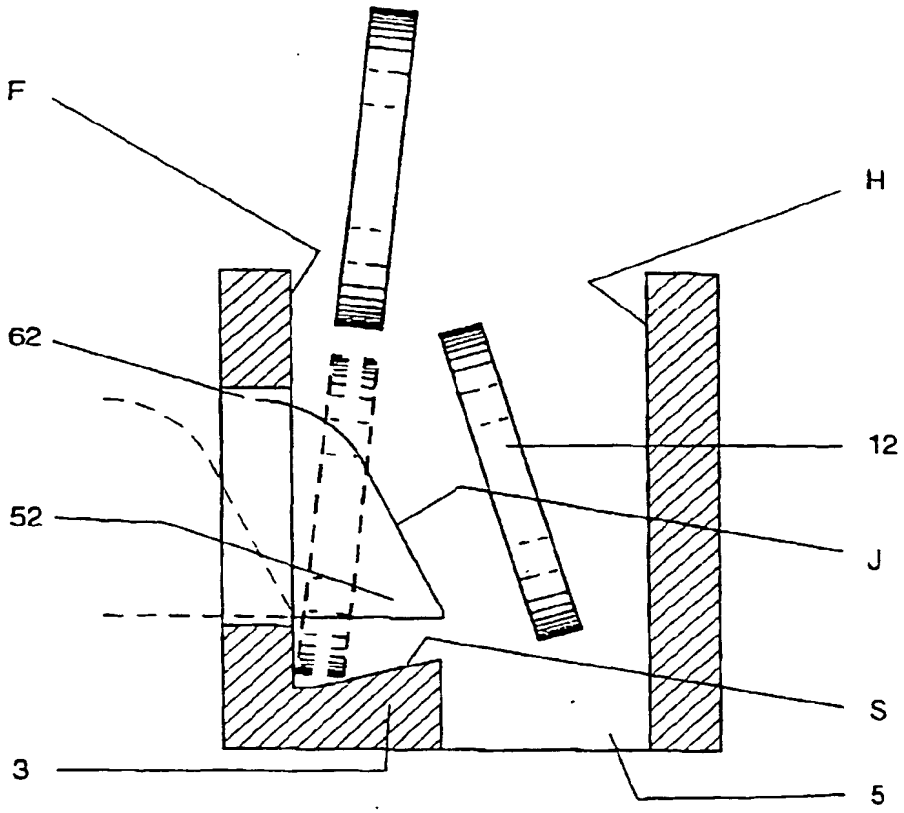


Figure 6a

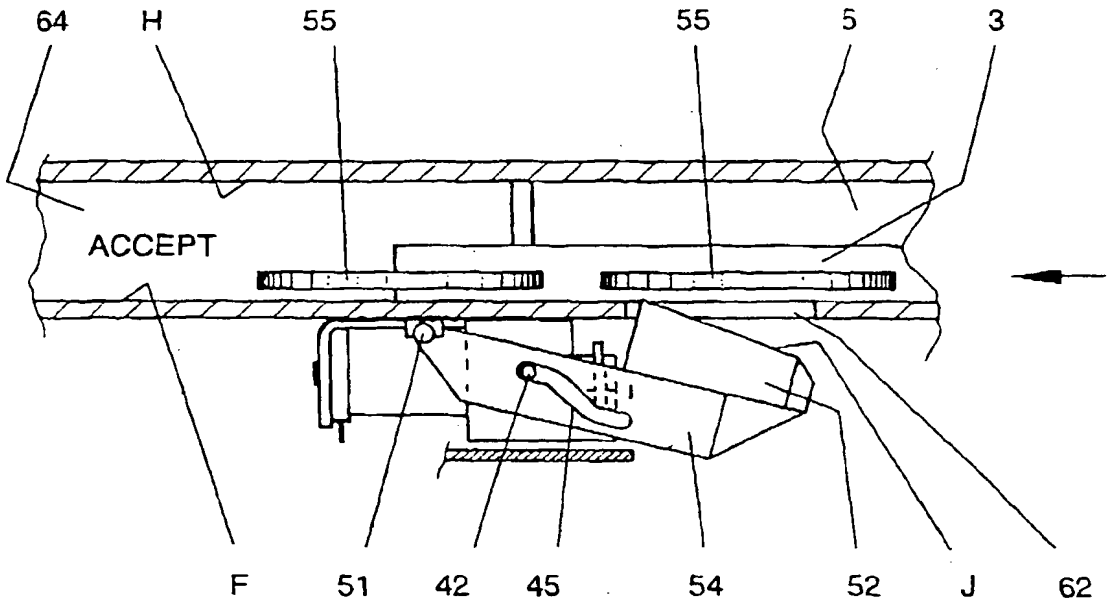


Figure 6b

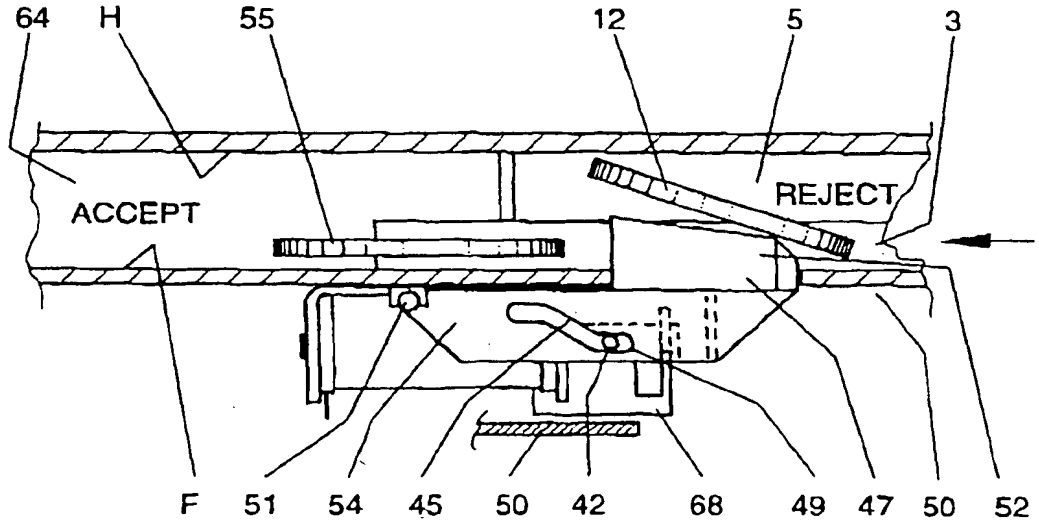
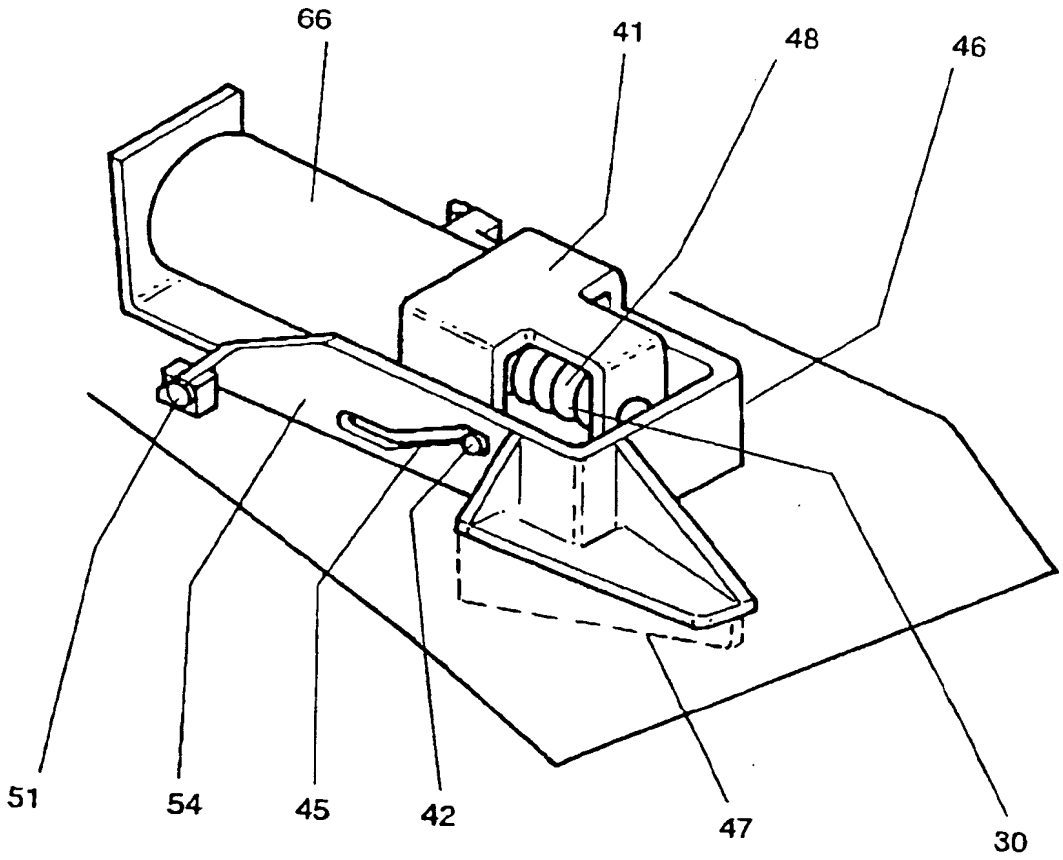


Figure 7



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 974 938 A3

(12) EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
31.01.2001 Bulletin 2001/05

(43) Date of publication A2:
26.01.2000 Bulletin 2000/04

(21) Application number: **99305848.6**

(22) Date of filing: **23.07.1999**

(51) Int Cl.[7]: **G07D 5/00**, G07F 1/04

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **23.07.1998 AU PP480498**

(71) Applicant: **Microsystems Controls Pty Limited**
South Melbourne, Victoria 3205 (AU)

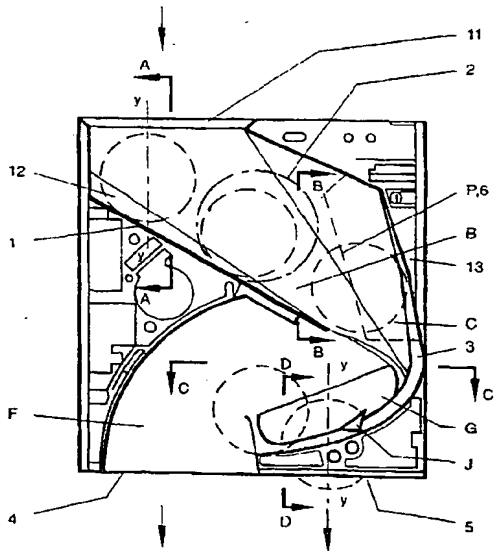
(72) Inventors:
- **Smith, Peter**
  Essendon, Victoria 3040 (AU)
- **Laws, Adam**
  Birchgrove, New South Wales 2041 (AU)

(74) Representative:
Dunlop, Brian Kenneth Charles et al
c/o Wynne-Jones, Lainé & James
22 Rodney Road
Cheltenham Gloucestershire GL50 1JJ (GB)

(54) Improvement in coin validators

(57) A validator for coins including a coin entry (11) though which a coin (12) can pass to enter the validator, coin exit (4, 5) through which the coin can pass as it leaves the validator, and at least one coin rail (1) upon which the coin (12) rolls upon entry into the validator until just prior to exiting the validator, the coin (12) remaining in continuous contact (as defined herein) with the at least one coin rail (1) as it passes through the validator.

Figure 2



EP 0 974 938 A3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 30 5848

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 96 04616 A (COIN CONTROLS ;BELL MICHAEL (GB); WOOD DENNIS (GB)) 15 February 1996 (1996-02-15)	1,2	G07D5/00 G07F1/04
A	* page 3, line 18 - page 5, line 19 * * figures 2,3A *	5,6	
A	FR 2 474 207 A (SCHEIDT & BACHMANN GMBH) 24 July 1981 (1981-07-24) * page 3, line 17 - page 4, line 20 * * figures 1,2 *	1,2,5,8, 9,12	
A	FR 2 401 471 A (AUTOMATISME CIE GLE) 23 March 1979 (1979-03-23) * the whole document *	1,2	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

G07D
G07F

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 September 2000	Bocage, S

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

European Patent Office

Application Number
EP 99 30 5848

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-21, 28

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 99 30 5848

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-21,28

   A validator for coins.

2. Claims: 22-28

   A gate for a coin validator.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 30 5848

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-09-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9604616 A	15-02-1996	AU 686405 B	05-02-1998
		AU 2803495 A	04-03-1996
		CA 2196537 A	15-02-1996
		DE 69505139 D	05-11-1998
		DE 69505139 T	15-04-1999
		EP 0774146 A	21-05-1997
		ES 2122639 T	16-12-1998
		JP 10508395 T	18-08-1998
FR 2474207 A	24-07-1981	DE 3002222 A	30-07-1981
		CH 649165 A	30-04-1985
		NL 8007038 A	17-08-1981
		SE 458970 B	22-05-1989
		SE 8100345 A	24-07-1981
FR 2401471 A	23-03-1979	ES 472774 A	16-02-1979
		IT 1097417 B	31-08-1985

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

This Page is Inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☑ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.
As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.